

CLAIMS

By this response, no claims are amended, added, or canceled. For the Examiner's convenience, a copy of all pending claims and a status of the claims is provided below.

1. (Previously Presented) A method of evaluating the effect of defects on components in a semiconductor manufacturing process, said method comprising the steps of:

- inspecting a component for defects using an inspection tool;
- recording defect inspection data from the inspection tool;
- accessing design data from a design data repository corresponding to the component being inspected;
- modifying said design data for the component according to said defect inspection data;
- analyzing said modified design data;
- classifying the defects into critical defects and the non-critical defects based on the analyzing; and
- determining a final disposition of the component by applying different acceptance rules to the critical defects and the non-critical defects.

2. (Original) The method of claim 1, wherein the components being inspected comprise masks for semiconductor wafers and the components are combined to generate a mask layer.

3. (Original) The method of claim 1, wherein the inspection tool is an optical inspection device and said defect inspection data include defect location, defect size and a designation of defect type as clear or opaque.

4. (Original) The method of claim 2, wherein said final disposition of the mask being inspected includes one of: scrapping the mask, repairing the mask, and accepting the mask.

5. (Previously Presented) The method of claim 2, wherein said determining includes a determination as to whether a defect would be likely to cause product failure.

6. (Original) The method of claim 3, wherein said designation of defect type as clear or opaque is performed by one of manually by an operator and a defect classification tool.

7. (Original) The method of claim 3, wherein said defect inspection data comprise intensity contour plots, and the method for modifying said design data includes the following steps:

- creating a simulated wafer image of the defect; and
- merging said simulated wafer image into a simulated wafer image of a semiconductor chip.

8. (Original) The method of claim 1, wherein said design data repository comprises a database suitable for storage of large data files, and wherein said database includes design data for each component being inspected.

9. (Original) The method of claim 2, wherein the method for modifying said design data comprises the step of generating a representative defect shape for each mask layer being inspected corresponding to defects from said defect inspection data.

10. (Previously Presented) The method of claim 2, wherein said analyzing comprises analyzing both intra-level and inter-level problems of the mask layer corresponding to said inspection defect data.

11. (Previously Presented) A method of evaluating the effect of defects on masks for semiconductor wafers, said method comprising the steps of:

- inspecting a mask for defects using an inspection tool;
- recording defect inspection data from the inspection tool;
- accessing design data from a design data repository corresponding to a level of a mask layer being inspected;
- modifying said design data for said level of a mask layer according to said defect inspection data;
- analyzing said modified design data;

classifying the defects into critical defects and non-critical defects based on the analyzing; and

determining a final disposition of the mask by applying different acceptance rules to the critical defects and the non-critical defects.

12. (Original) The method of claim 11, wherein said final disposition of the mask includes one of: scrapping the mask, repairing the mask, and accepting the mask, and said previously established criteria includes a determination as to whether a defect would be likely to cause product failure.

13. (Original) The method of claim 12, said method further comprising the steps of:
repairing masks in which defects identified from the inspection tool are within acceptable limits; and

scrapping masks in which defects identified from the inspection tool are outside acceptable limits.

14. (Original) The method of claim 11, further comprising the step of determining if a defect identified from the inspection tool will be resolved on a wafer by the photolithographic process.

15. (Original) The method of claim 14, wherein said method for determining if said defect will be resolved on the wafer is one of a set of heuristic rules and a commercially available tool or software program.

16. (Previously Presented) A system for evaluating the effect of defects in masks for semiconductor wafers during pre-shipment inspection and pre-acceptance inspection of masks for semiconductor wafers, said system comprising:

an inspection tool for inspecting a mask for defects;
a recording medium for storing said defect inspection data from the inspection tool;
a design data repository containing design level data for a level of a mask layer being inspected;

a computer program for modifying said design data for said level of mask layer according to said defect inspection data; and

a rule set for analyzing said modified design data to determine a final disposition of the mask according to previously established criteria,

wherein the final disposition of the mask is determined after the defects are classified into critical defects and non-critical defects and by applying different acceptance rules to the critical defects and the non-critical defects.

17. (Original) The system of claim 16, wherein said final disposition of the mask includes one of: scrapping the mask, repairing the mask, and accepting the mask, and said previously established criteria includes a determination as to whether a defect would be likely to cause product failure.

18. (Original) The system according to claim 17, wherein the inspection tool is an optical inspection device and defect inspection data include defect location, defect size and a designation of defect type as clear or opaque.

19. (Previously Presented) A computer readable medium comprising code for causing a computer to implement steps of a method for evaluating the effect of defects on masks in a semiconductor manufacturing process, said method comprising:

inspecting a mask for defects using an inspection tool;
recording defect inspection data from the inspection tool;
accessing design data from a design data repository corresponding to a level of a mask layer being inspected;

modifying said design data for said level of a mask layer according to said defect inspection data;

analyzing said modified design data;
classifying the defects into critical defects and non-critical defects based on the analyzing; and

determining a final disposition of the mask by applying different acceptance rules to the critical defects and the non-critical defects.

20. (Original) The method of claim 19, wherein said final disposition of the mask includes one of: scrapping the mask, repairing the mask, and accepting the mask, and said previously established criteria includes a determination as to whether a defect would be likely to cause product failure.

Claims 21-35 (Canceled).

36. (Previously Presented) A method of evaluating the effect of defects on components in a semiconductor manufacturing process, said method comprising:

- inspecting a component for defects using an inspection tool;
- storing defect inspection data from the inspection tool;
- generating shapes representing the defects;
- retrieving design data from a design data repository corresponding to the component being inspected; and
- performing an analysis using the design data, the generated shapes, and a pre-determined rule set to determine whether the defects are critical defects and non-critical defects,

wherein a final disposition of the component is determined by applying different acceptance rules to the critical defects and the non-critical defects.

37. (Previously Presented) The method of claim 1, wherein the classifying the defects comprises:

- determining critical portions and non-critical portions of the component; and
- determining if the defects are in the critical portions or the non-critical portions.

38. (Previously Presented) The method of claim 1, wherein the applying different acceptance rules comprises:

- applying a first acceptance rule to the defects located in critical portions of the component; and
- applying a second acceptance rule, that is looser than the first acceptance rule, to the defects located outside the critical portions of the component.

39. (Previously Presented) The method of claim 11, wherein the classifying the defects comprises:

- determining critical portions and non-critical portions of the mask; and
- determining if the defects are in the critical portions or the non-critical portions.

40. (Previously Presented) The method of claim 11, wherein the applying different acceptance rules comprises:

- applying a first acceptance rule to the defects located in critical portions of the mask; and
- applying a second acceptance rule, that is looser than the first acceptance rule, to the defects located outside the critical portions of the mask.

41. (Previously Presented) The method of claim 16, wherein the classifying the defects comprises:

- determining critical portions and non-critical portions of the mask; and
- determining if the defects are in the critical portions or the non-critical portions.

42. (Previously Presented) The method of claim 16, wherein the applying different acceptance rules comprises:

- applying a first acceptance rule to the defects located in critical portions of the mask; and
- applying a second acceptance rule, that is looser than the first acceptance rule, to the defects located outside the critical portions of the mask.

43. (Previously Presented) A method of evaluating the effect of defects on components in a semiconductor manufacturing process, said method comprising:

- inspecting a component for a defect using an inspection tool;
- storing defect inspection data from the inspection tool;
- generating a shape representing the defect;
- retrieving design data from a design data repository corresponding to the component being inspected;
- reading a first rule from a predetermined rule set of a plurality of rules; and

determining whether to repair, accept, or scrap the component based upon the defect by applying the first rule to the generated shape.

44. (Previously Presented) The method of claim 43, wherein the first rule specifies the minimum acceptable distance between the defect and an other shape on a same design level of a mask.

45. (Previously Presented) The method of claim 43, wherein the first rule specifies the minimum acceptable distance between the defect and an other shape on a different design level of a mask.

46. (Previously Presented) The method of claim 43, further comprising:
reading a second rule from the predetermined rule set of a plurality of rules;
determining whether to repair, accept, or scrap the component based upon the defect by applying the second rule to the generated shape.